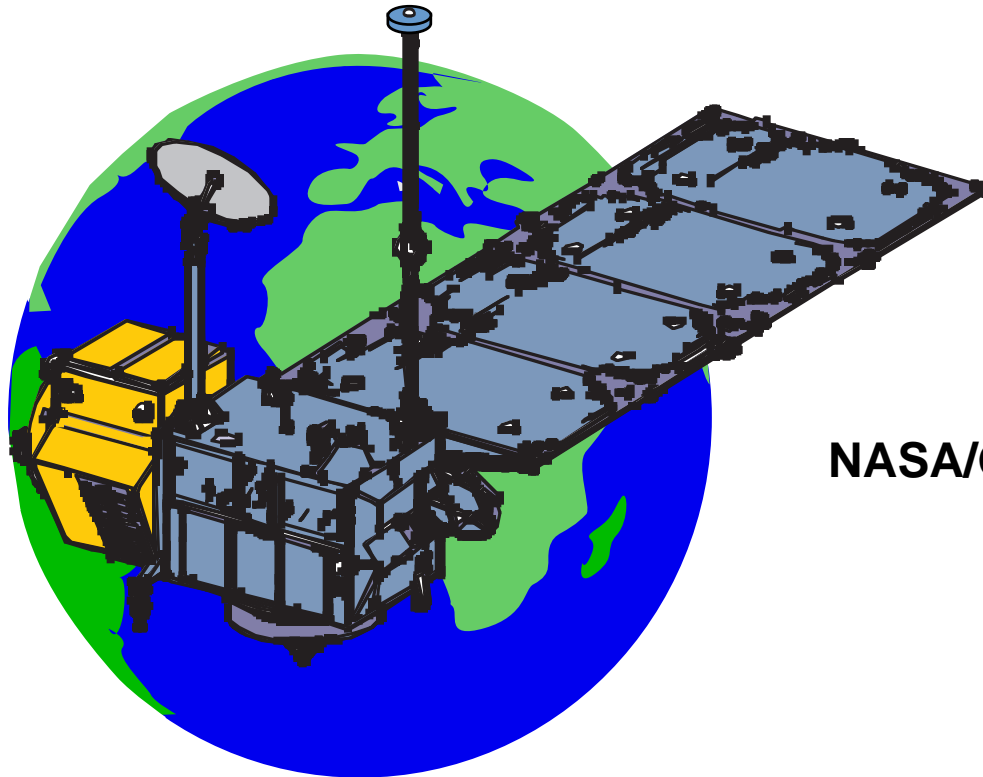


TOPEX/Poseidon

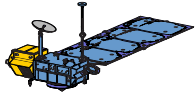
Satellite/Sensors Performance Characteristics Workshop #6



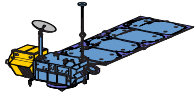
Presented By:
John Hultberg
Jet Propulsion Laboratory

Prepared By:
David Hancock
NASA/GSFC Wallops Flight Facility

Presented At:
JPL
July 22, 1997

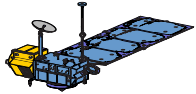


- TOPEX Altimeter Turned On:
 - IDLE Aug. 21, 1992
 - TRACK Aug. 26, 1992
- From Turn On Until July 22, 1997:
 - OFF 394 Hours
 - IDLE 4,350 Hours
 - TRACK MODE 38,350 Hours



Status

- No Configuration Changes Since Workshop #5.
- No Indication of Developing Problems.
- Performance Requirements Are Being Met.
- Side B Has Not Yet Been Turned On.

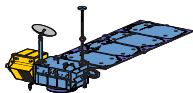


TOPEX ALT

Configuration

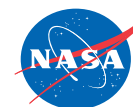
- No Change in Operating Parameters Since February 9, 1995.
 - Provided Faster Acquisitions After an SEU.
- No Change in Onboard Software Since November 23, 1992.
 - Software Patch to Refresh Pulse Count

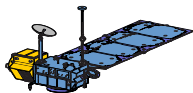




NASA Altimeter - Key Events

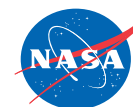
<u>Day</u>	<u>Event</u>
92/234	Altimeter Turned On to IDLE Mode
92/238	First TRACK
92/240	Safehold During Inclination Maneuver
92/242	Turned Off by TMON at Start of Eclipse
92/247	Improper SEU Recovery due to Corruption of Pulse Count Variable
92/268	Safehold
92/304	50ms Acquisition Parameter Set Upload
92/328	Software Patch to Refresh Pulse Count (see Day 247 above)
92/354	Loss of Science Data and Clock Between SEUs (lost 16 hours of data)
93/012	Improper SEU Recovery (lost 12 min. of data)
93/069	Digital Filter-Bank Leakage Test
93/089	Turned Off by TMON
93/089	Changed to IDLE Mode For SSALT
93/099	Returned to TRACK Mode
93/198	Changed to IDLE Mode For SSALT
93/208	Returned to TRACK Mode
93/218	Turned Off by TMON
93/230	Improper SEU Recovery (lost 1.5 hours of data)
93/264	Improper SEU Recovery (lost 14.5 hours of data)
93/266	Improper SEU Recovery (lost 7.5 hours of data)
93/297	Changed to IDLE Mode For SSALT

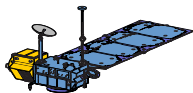




NASA Altimeter - Key Events (continued)

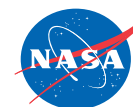
<u>Day</u>	<u>Event</u>
93/307	Returned to TRACK Mode
93/307	Improper SEU Recovery (lost 2.3 hours of data)
93/330	Improper SEU Recovery (lost 8.2 hours of data)
94/001	Improper SEU Recovery (lost 3.7 hours of data)
94/041	Transmit Test
94/042	Transmit Test
94/045	Transmit Test
94/071	Changed to IDLE Mode For SSALT
94/081	Returned to TRACK Mode
94/112	Improper SEU Recovery (lost 1.1 hours of data)
94/170	Changed to IDLE Mode For SSALT
94/180	Returned to TRACK Mode
94/256	Improper SEU Recovery (lost 4.3 hours of data)
94/288	Improper SEU Recovery (lost 2.5 hours of data)
94/294	Improper SEU Recovery (lost 1.3 hours of data)
94/309	Changed to IDLE Mode for SSALT
94/319	Returned to TRACK Mode
94/324	Improper SEU Recovery (lost 3.1 hours of data)
95/012	Improper SEU Recovery (lost 0.7 hours of data)
95/040	Changed Operating Parameter Set for Faster Acquisition after a Reset
95/040	Digital Filter-Bank Leakage Test
95/063	Changed to IDLE Mode for SSALT
95/073	Returned to TRACK Mode

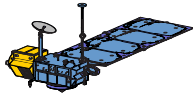




NASA Altimeter - Key Events

<u>Day</u>	<u>Event</u>
95/083	Improper SEU Recovery (lost 1.6 hours of data)
95/123	Changed to IDLE Mode for SSALT
95/133	Returned to TRACK Mode
95/157	Improper SEU Recovery (lost 8.4 hours of data)
95/182	Changed to IDLE Mode for SSALT
95/192	Returned to TRACK Mode
95/251	Improper SEU Recovery (lost 3.9 hours of data)
95/291	Changed to IDLE Mode for SSALT
95/301	Returned to TRACK Mode
95/306	Improper SEU Recovery (lost 3.4 hours of data)
95/325	Improper SEU Recovery (lost 1.8 hours of data)
95/327	Improper SEU Recovery (lost 3.5 hours of data)
95/330	Spacecraft Safehold (lost 230 hours of data)
95/361	Improper SEU Recovery (lost 3.3 hours of data)
96/019	Improper SEU Recovery (lost 2.0 hours of data)
96/020	Spacecraft Safehold (lost 68 hours of data)
96/040	Digital Filter-Bank Leakage Test
96/041	Improper SEU Recovery (lost 3.1 hours of data)
96/046	Changed to IDLE Mode for SSALT
96/056	Returned to TRACK Mode
96/057	Improper SEU Recovery (lost 2.2 hours of data)
96/058	Turned Off by TMON (lost 5.3 hours of data)
96/077	Improper SEU Recovery (lost 1.6 hours of data)

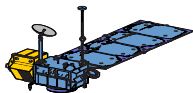




NASA Altimeter - Key Events

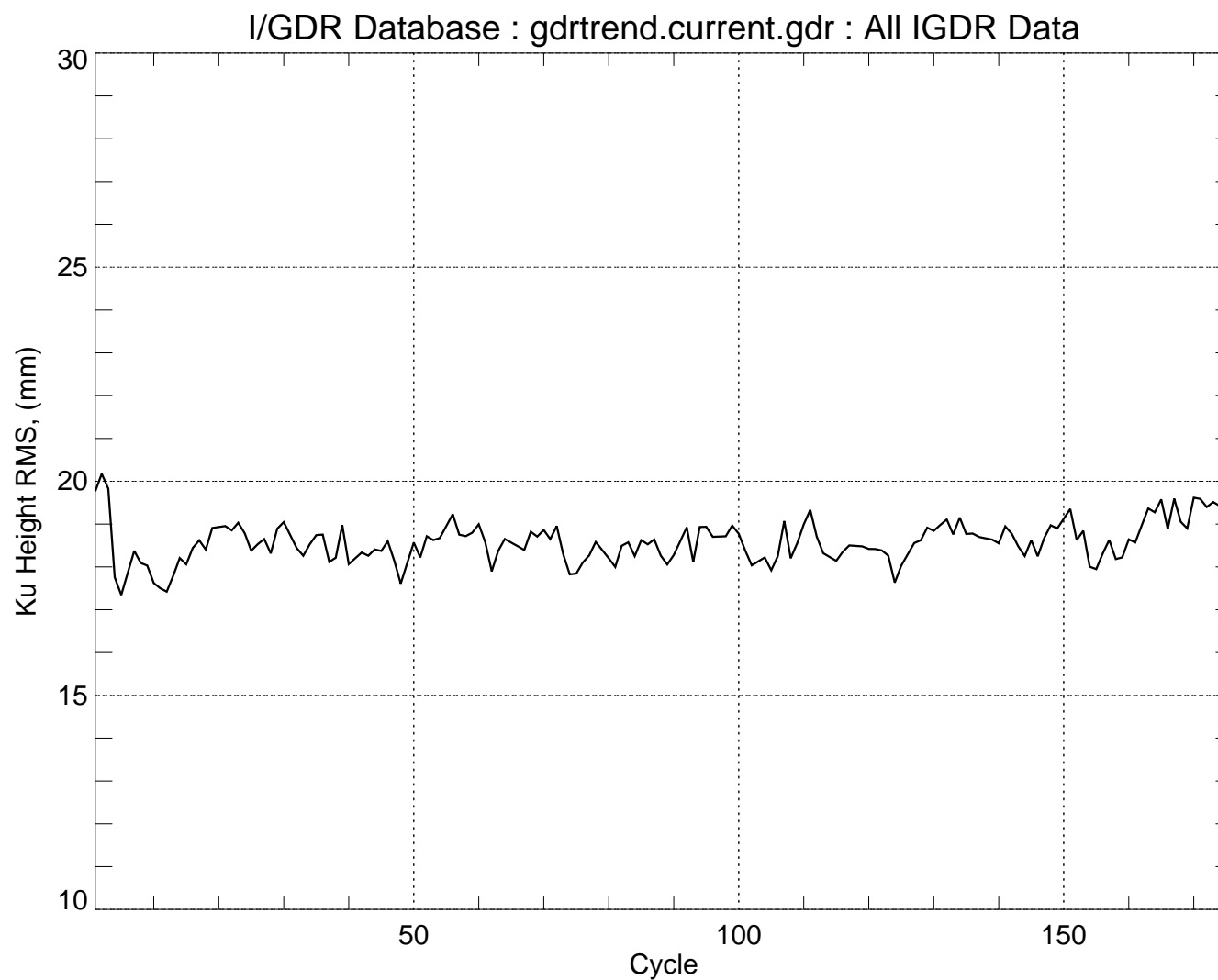
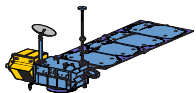
<u>Day</u>	<u>Event</u>
96/083	Onboard Tape Recorder Problem (lost 0.5 hours of data)
96/150	Onboard Tape Recorder Problem (lost 1.6 hours of data)
96/162	Improper SEU Recovery (lost 0.8 hours of data)
96/164	Changed to IDLE Mode for SSALT
96/174	Returned to TRACK Mode
96/178	Onboard Tape Recorder Problem (lost 0.4 hours of data)
96/187	Improper SEU Recovery (lost 0.7 hours of data)
96/197	Improper SEU Recovery (lost 1.1 hours of data)
96/217	Improper SEU Recovery (lost 2.8 hours of data)
96/226	Improper SEU Recovery (lost 4.9 hours of data)
96/236	Digital Filter-Bank Leakage Test
96/263	Turned off by TMON (lost 19.0 hours of data)
96/283	Changed to IDLE Mode for SSALT
96/293	Returned to TRACK Mode
96/362	C-Band Transmit on Side B (lost 4.8 hours of data)
97/036	Changed to IDLE Mode for SSALT
97/046	Returned to TRACK Mode
97/084	Digital Filter-Bank Leakage Test
97/099	Improper SEU Recovery (lost 1.0 hours of data)
97/155	Changed to IDLE Mode for SSALT
97/165	Returned to TRACK Mode

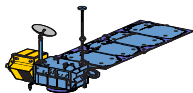




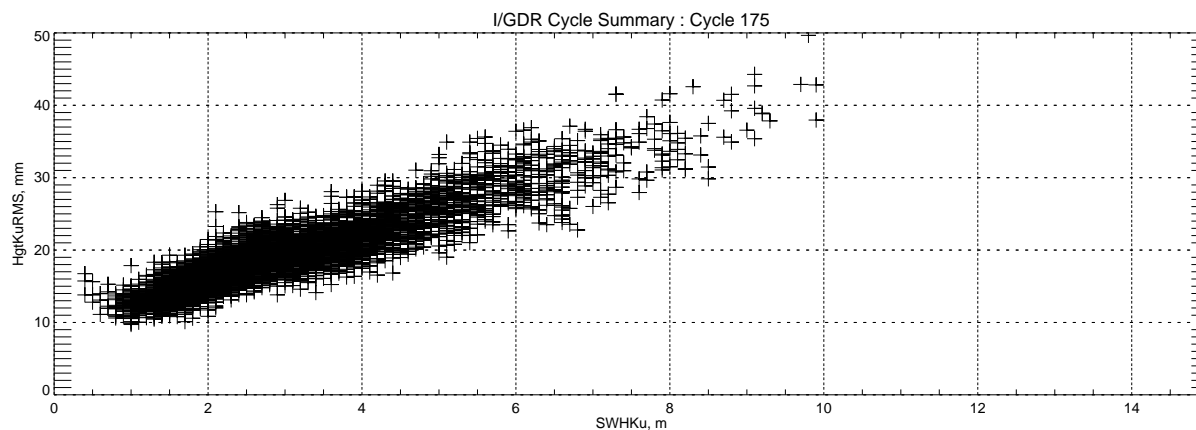
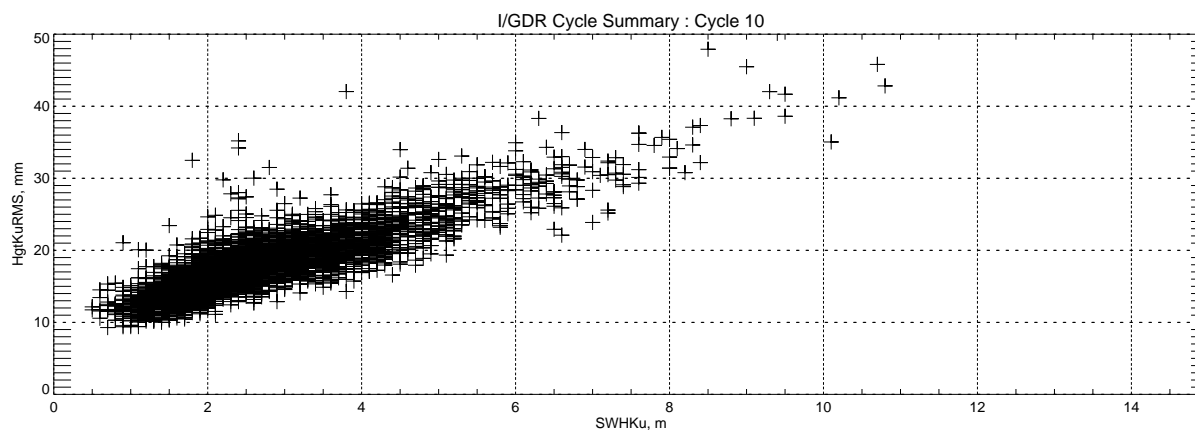
	Significant Waveheight					
	2m		4m		8m	
	Spec	On-Orbit	Spec	On-Orbit	Spec	On-Orbit
Combined	4.1	1.4 - 2.9	4.6	2.2 - 3.3	5.5	3.7 - 4.5
Ku	3.5	1.2 - 2.4	3.6	1.8 - 2.7	4.5	3.1 - 3.8
C	5.4	1.8 - 3.7	6.1	2.9 - 4.4	7.4	5.1 - 6.3

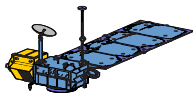
One-Second Range Measurement Noise Performance (in cm)





TOPEX ALT

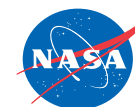


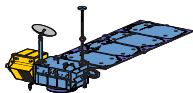


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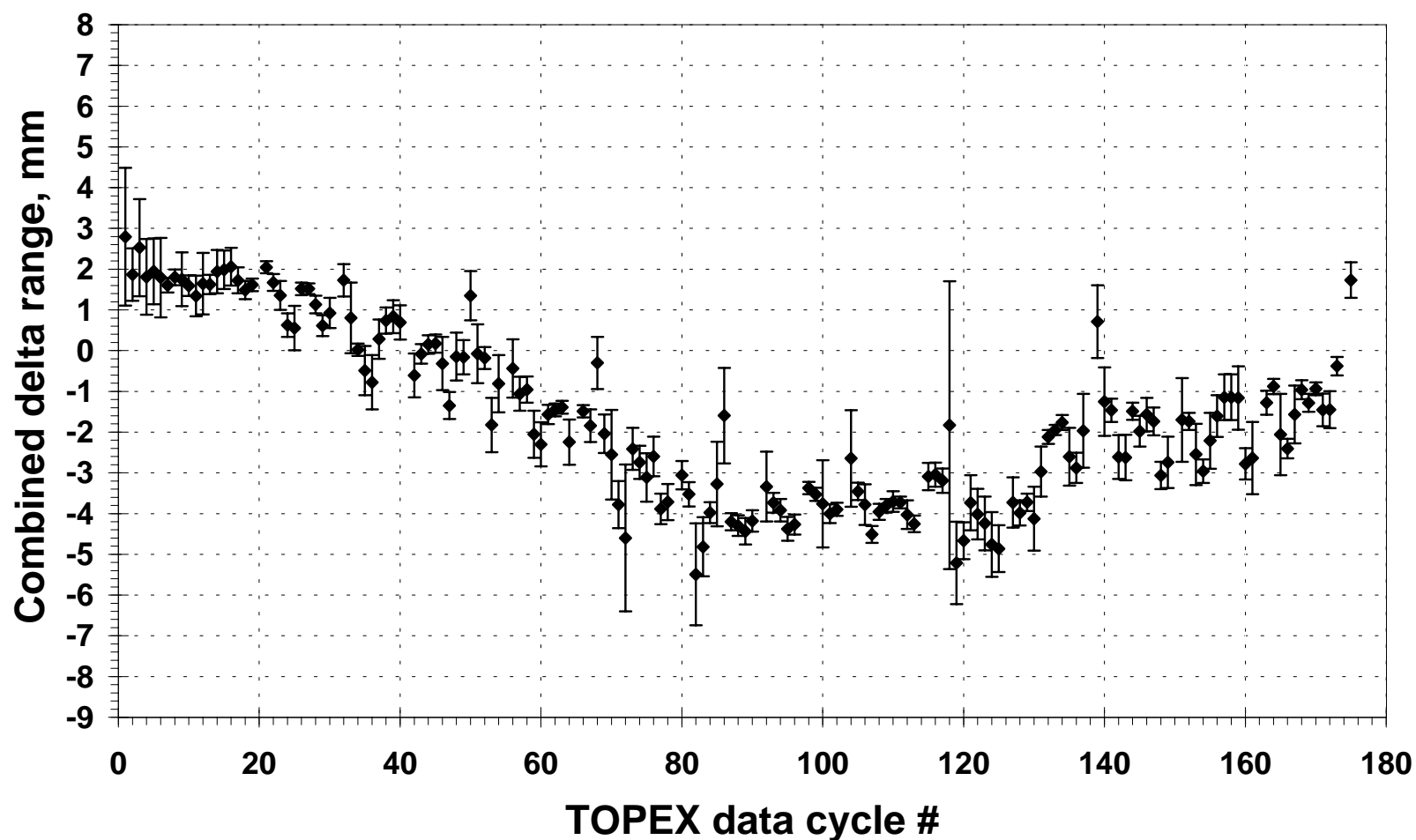
Internal Calibrations

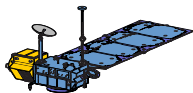
Measurement Type	Accuracy Specification	Calibration Accuracy	Comments
Range	± 1.5 cm	< 1.0 cm	<ul style="list-style-type: none">• Analysis shows a few millimeters of range drift.- Drift has continued towards its initial range.
AGC	± 0.25 dB	< 0.10 dB	<ul style="list-style-type: none">• Calibration corrections provided to Project.- WFF is providing per-cycle calibration corrections to the Project.



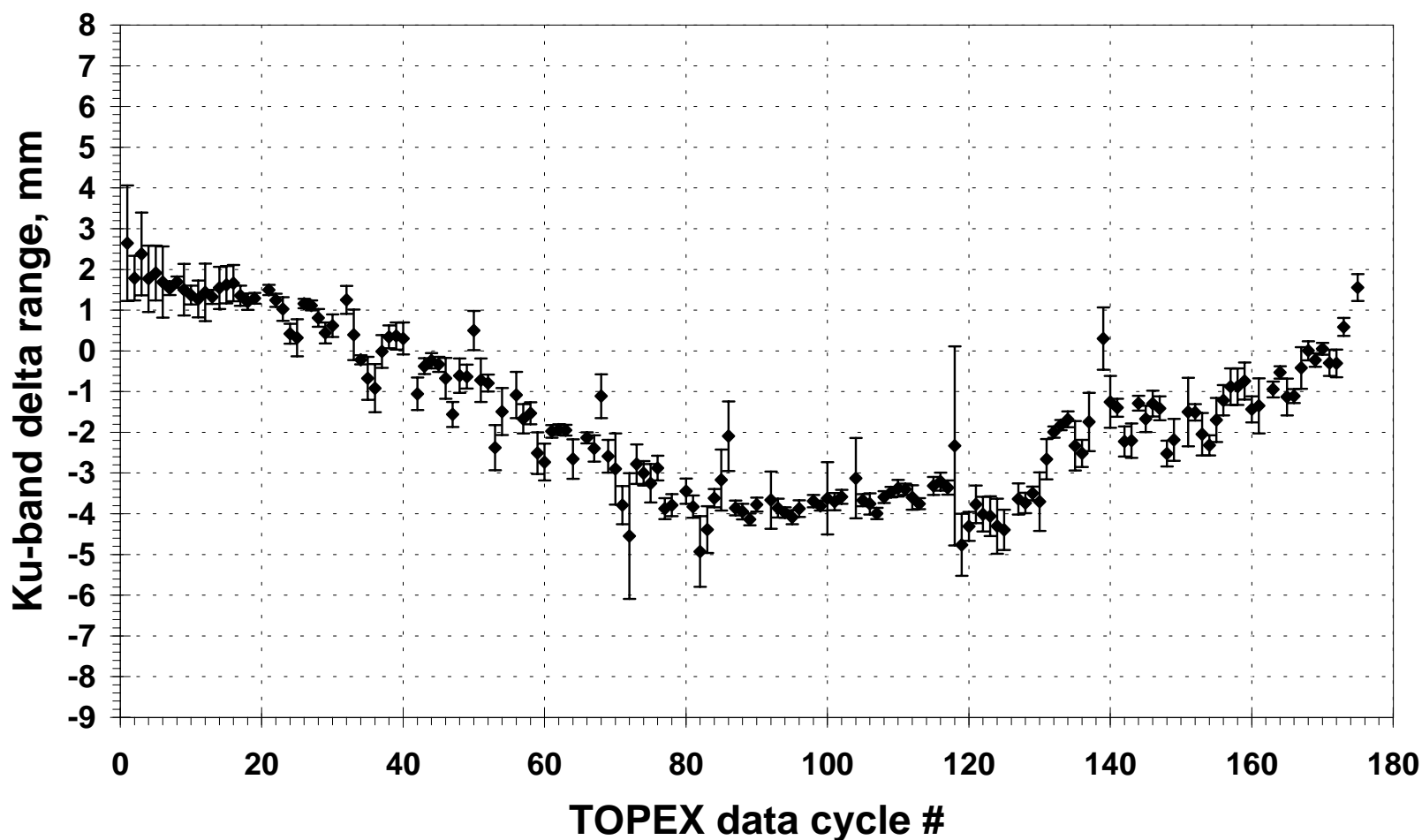


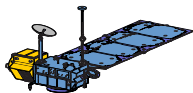
TOPEX Combined (Ku & C) Delta Range from Cal-1 Step 5 (corrected for DFB positioning quantization, but not for UCFM temperature)



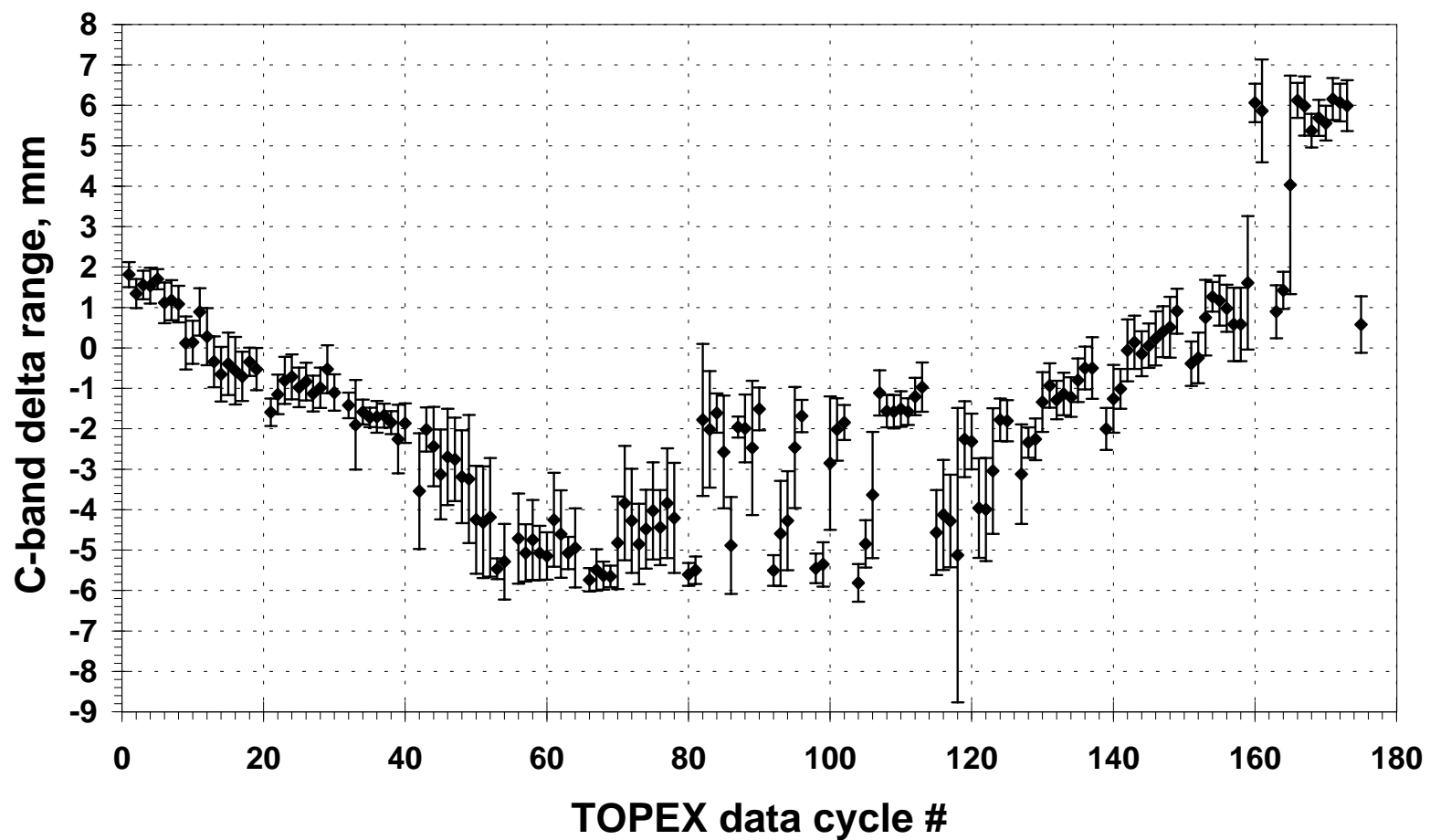


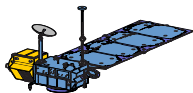
TOPEX Ku-Band Delta Range from Cal-1 Step 5 (corrected for DFB positioning quantization, but not for UCFM temperature)



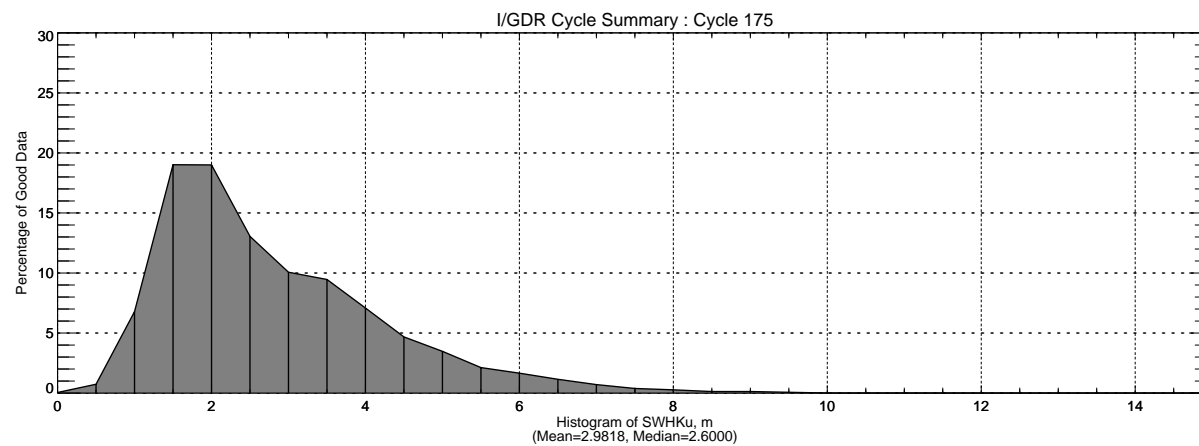
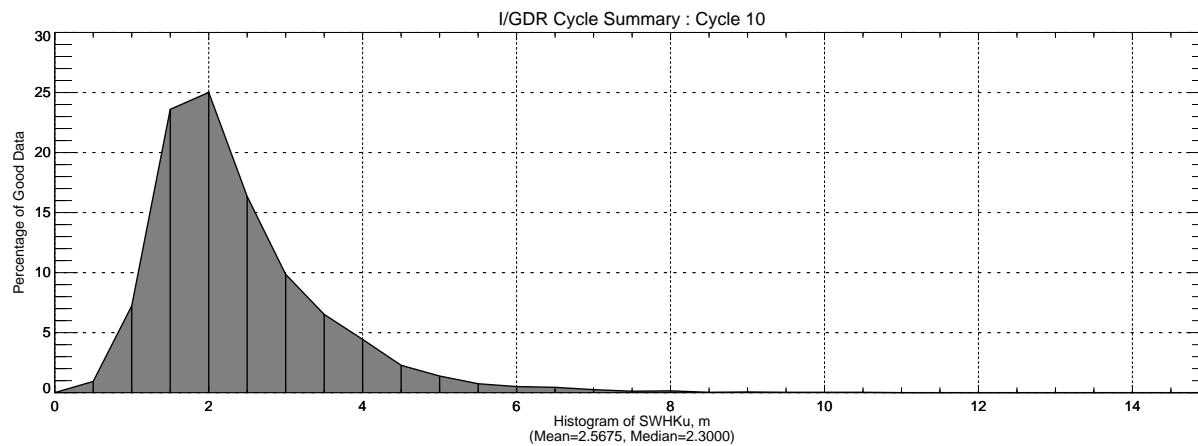


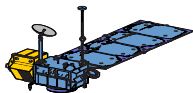
TOPEX C-Band Delta Range from Cal-1 Step 5 (corrected for DFB positioning quantization, but not for UCFM temperature)



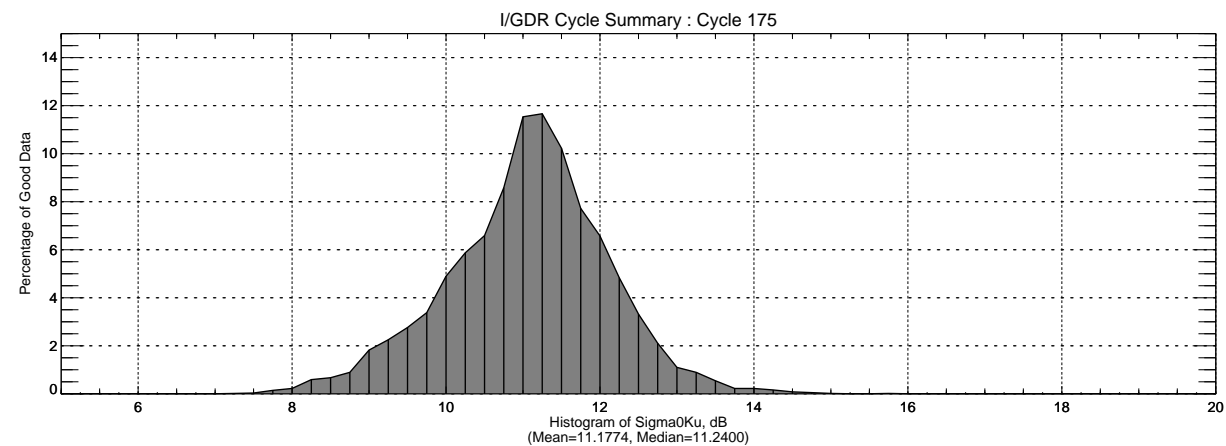
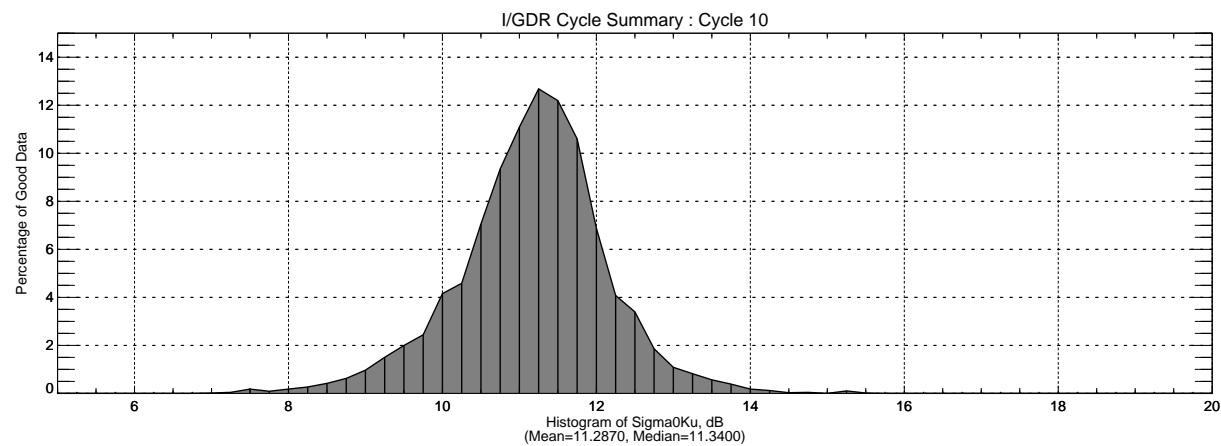


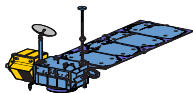
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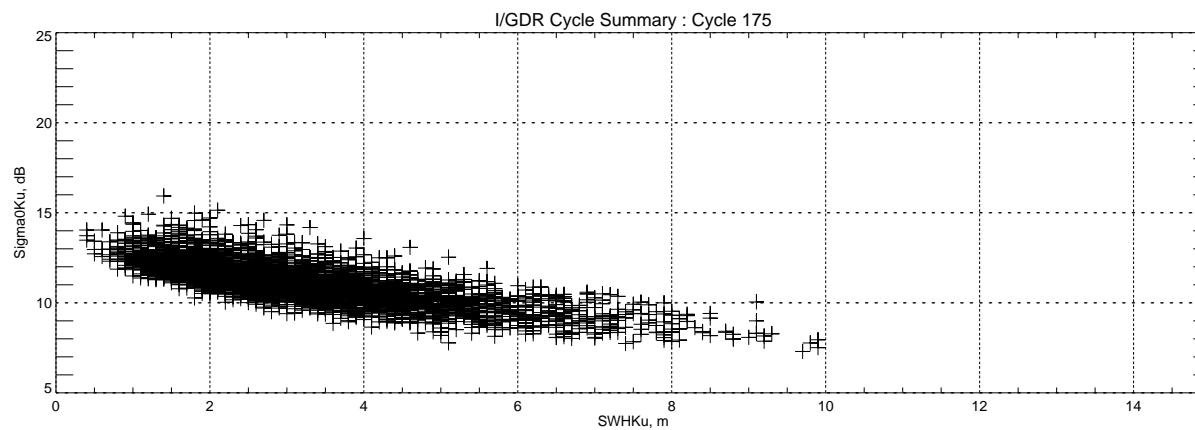
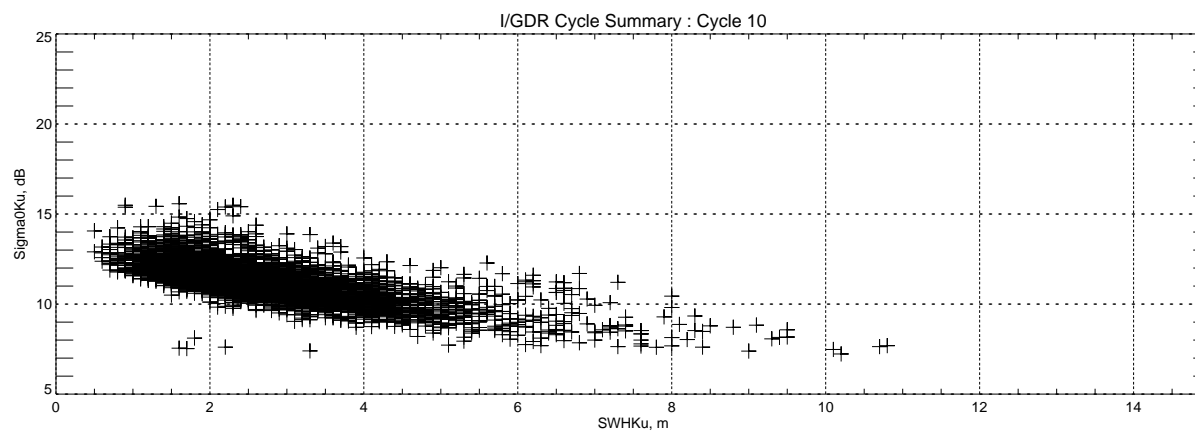


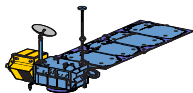
TOPEX ALT



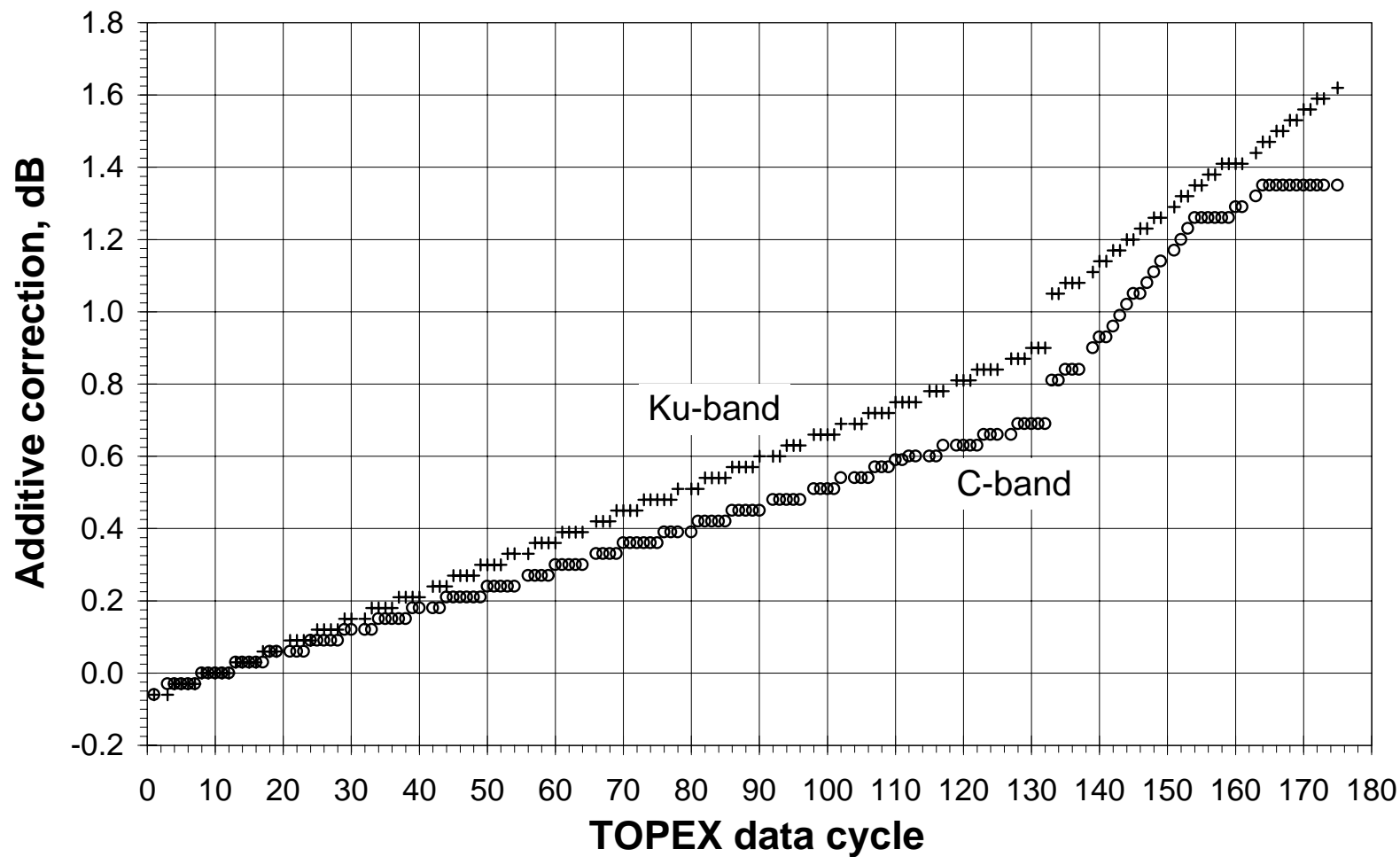


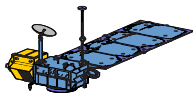
TOPEX ALT



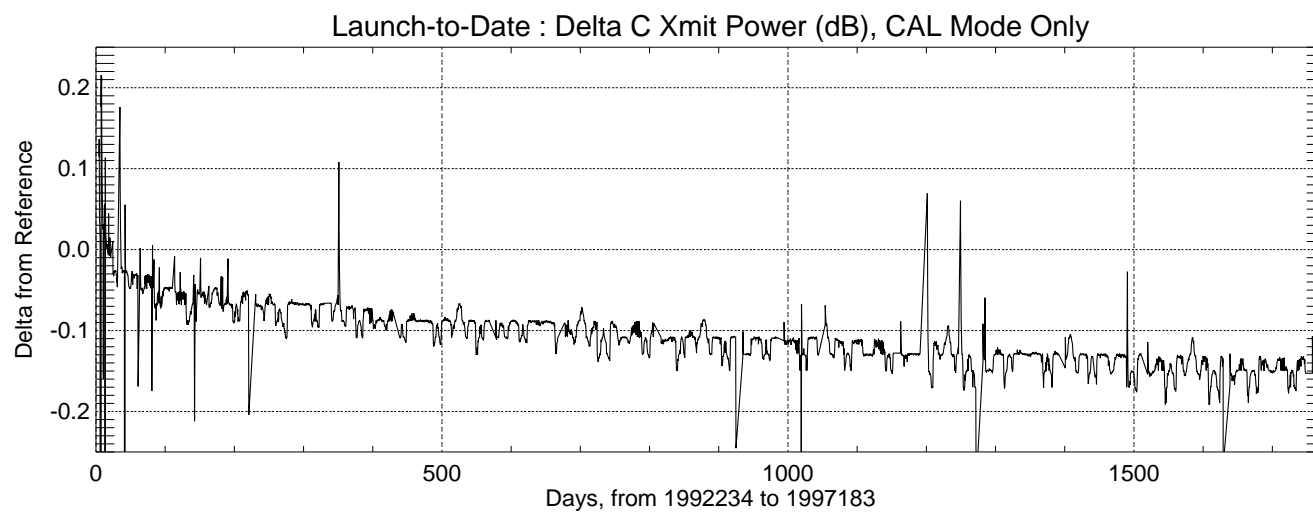
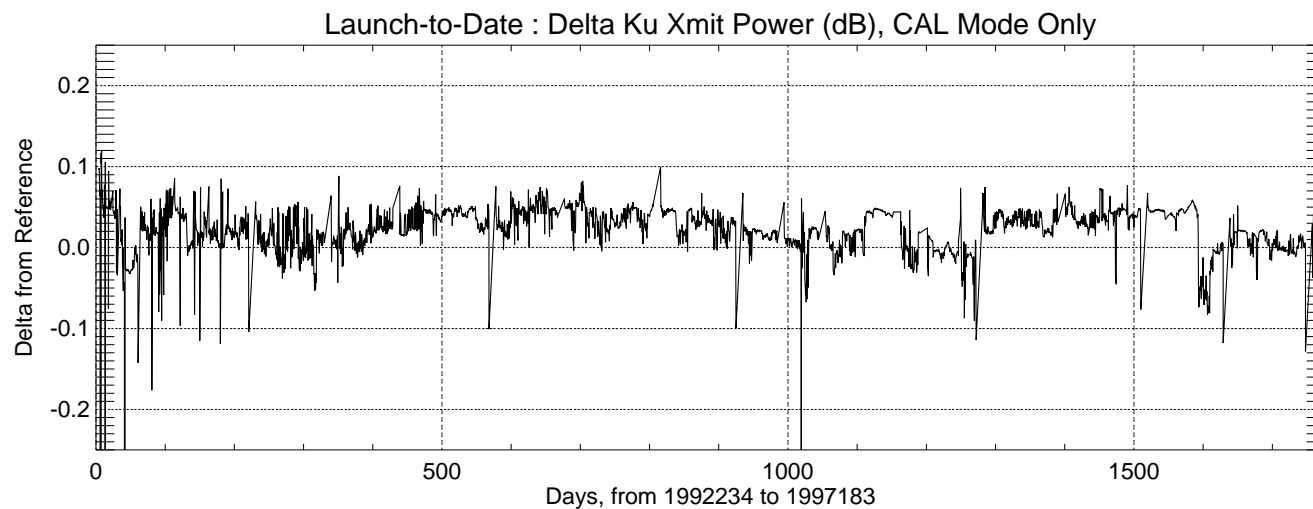


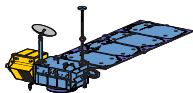
TOPEX Received Power Additive Correction



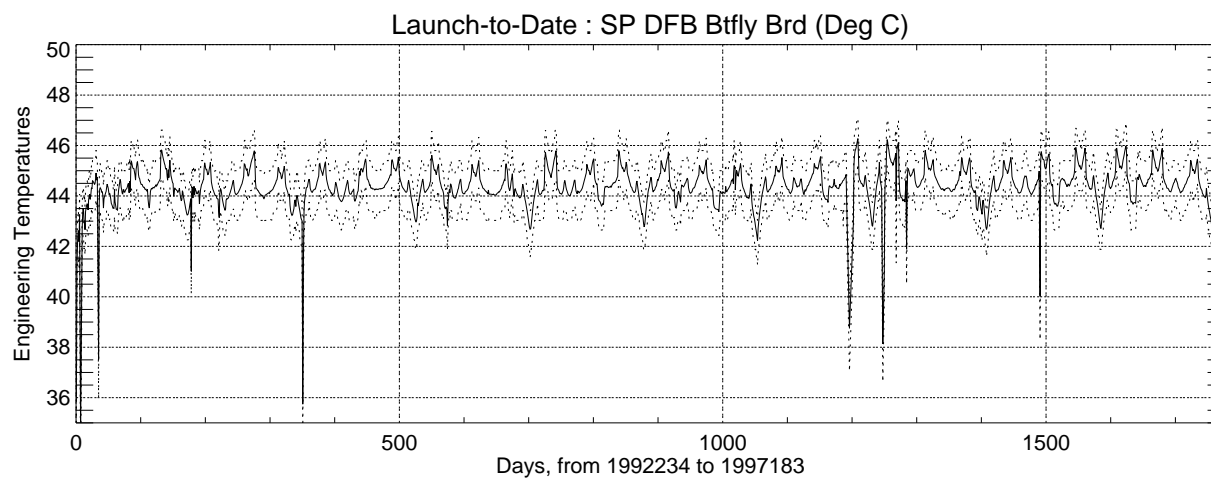
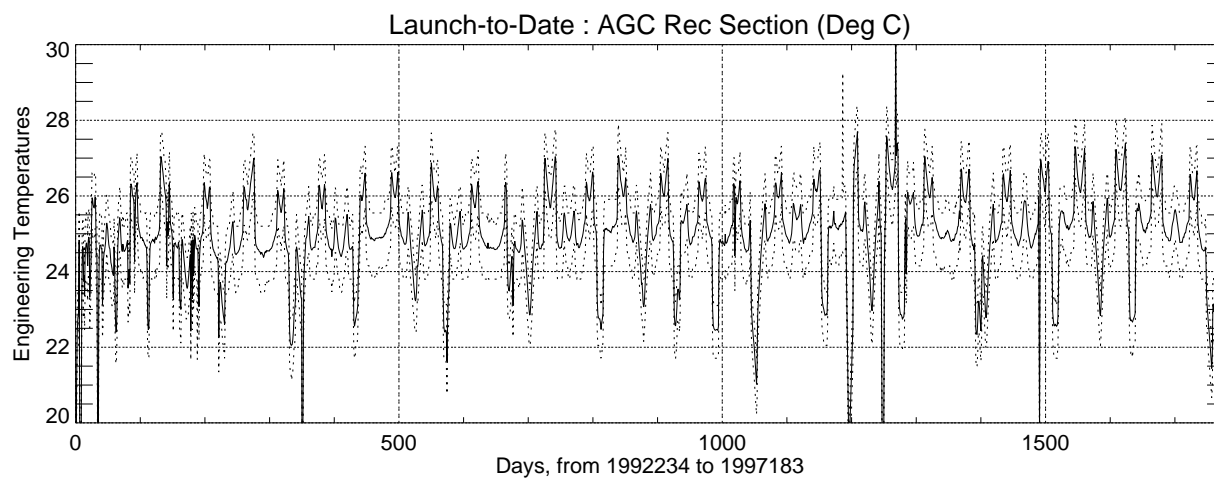


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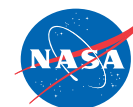


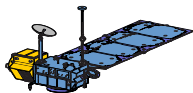


TOPEX ALT

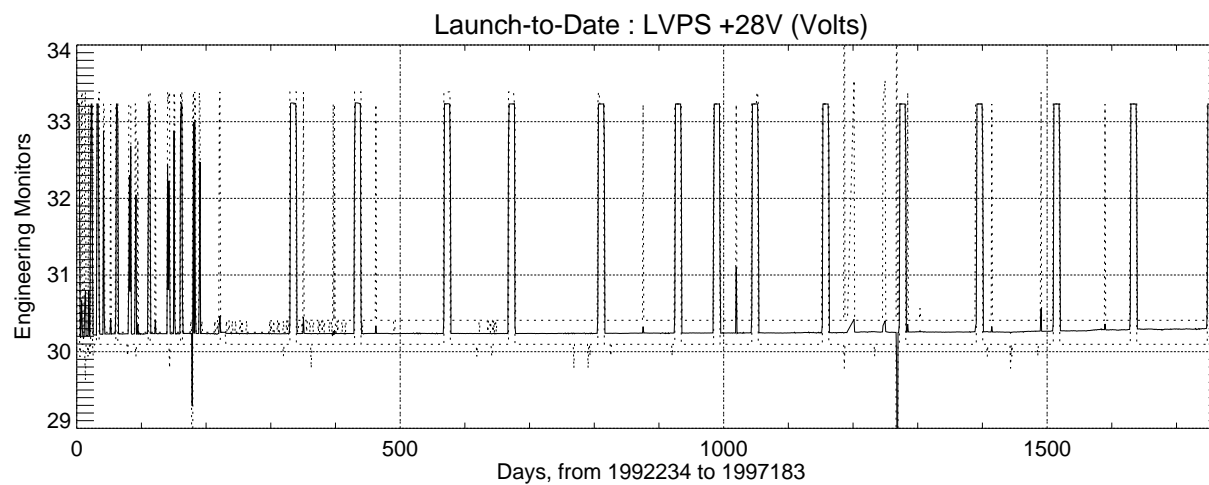


(24-Hour Averages)



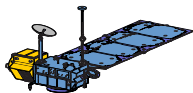


TOPEX ALT

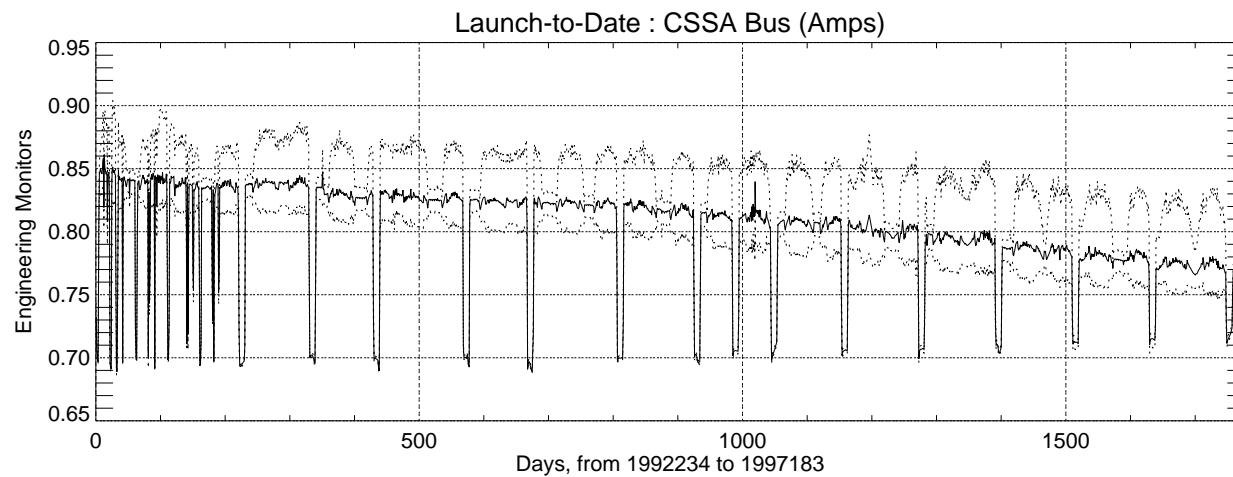
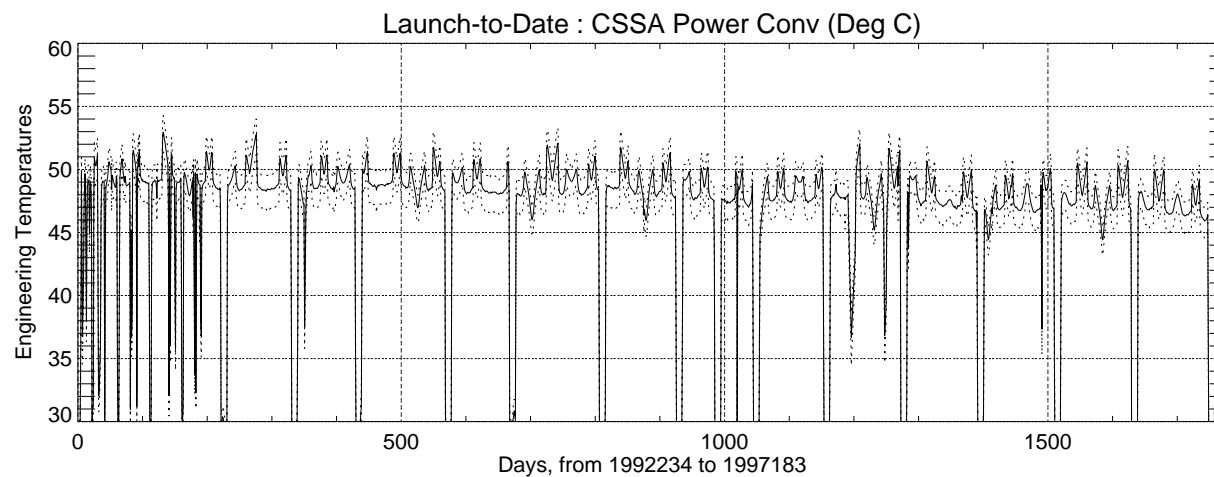


(24-Hour Averages)

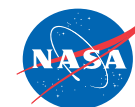


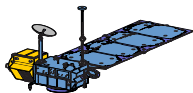


TOPEX ALT

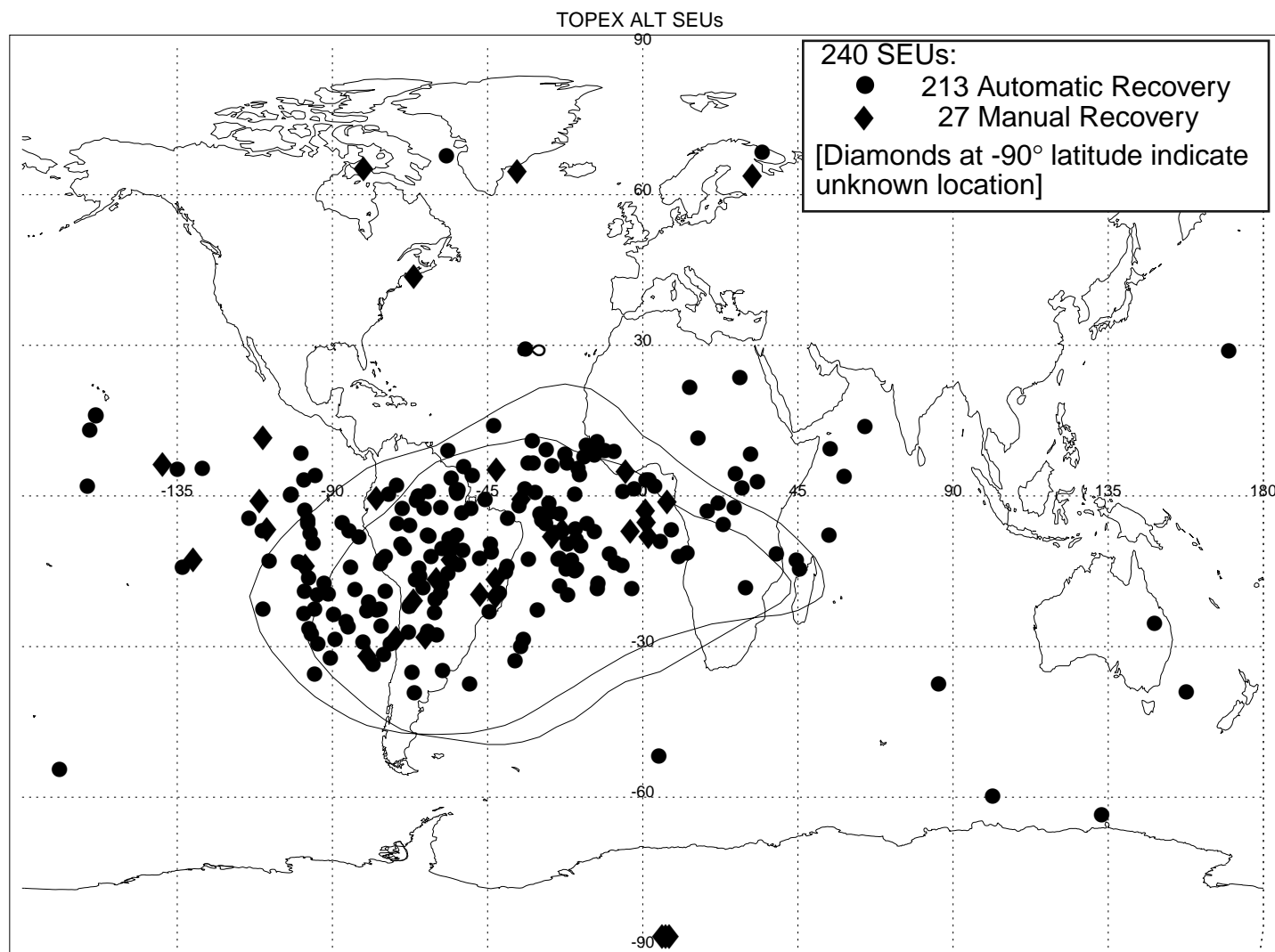


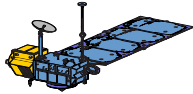
(24-Hour Averages)





TOPEX ALT





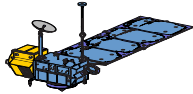
Workshop #5

Concerns

- CSSA Power Converter Temperature
 - Approximately 1°C decrease since launch.
No significant concern, matches a decrease in CSSA Bus current, no consequence predicted.
- AGC Trend
 - Approximately 1 dB loss since launch.
Considered to be within normal expected altimeter changes, no significant concern, no consequence predicted.

Update

- CSSA Power Converter Temperature
 - Trend continued, no consequence predicted. Closed.
- AGC Trend
 - Included in Workshop #6 concerns.



Workshop #6

Concerns

- MTU A/B Switch Problem (SEU 96/362)
 - Not harmful to system, but 4.8 hours of data lost.
 - It is alarmed.
 - Similar anomaly occurred earlier (SEU 95/157).
- AGC Trend
 - Slope of loss has increased; approximately 0.4 dB lost this year. Loss rate for prior two years was approximately 0.2 dB/year.
 - An investigation provided list of components that would be most suspect. No indication of pending hard failure.
 - Still ample signal margin for tracking. Initial corrections were over estimated.
 - Will continue to monitor.

Issues

- Software update being developed for uplink in late-Summer 1997, with the goal of achieving finer AGC resolution.
- WFF suggests that ALT Side B be turned on occasionally to provide best cross-calibration if there is ever an ALT Side A failure.